

PATENT COOPERATION TREATY

TRANSLATION

PCT

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year)

FOR FURTHER ACTION

See paragraph 2 below

Applicant's or agent's file reference

P05488700

International application No.

PCT/JP2005/016845

International filing date (day/month/year)

13.09.2005

Priority date (day/month/year)

13.09.2004

International Patent Classification (IPC) or both national classification and IPC

Applicant

NSK Ltd.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP

Date of completion of this opinion

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/016845

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
☒ the international application in the language in which it was filed
☐ the translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rule 12.3(a) and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ on paper
☐ in electronic form
 - c. time of filing/furnishing
☐ contained in the international application as filed
☐ filed together with the international application in electronic form
☐ furnished subsequently to this Authority for the purposes of search
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
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International application No.

PCT/JP2005/016845

Box No. IV

Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has, within the applicable time limit:
- ☒ paid additional fees
 - ☐ paid additional fees under protest and, where applicable, the protest fee
 - ☐ paid additional fees under protest but the applicable protest fee was not paid
 - ☐ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:

The "special technical feature" of the subject matters of claims 1 and 2 relates a constitution in which "a signal processing section determines whether there is an abnormality in the part, or whether or not there is an abnormality in the part and the degree of damage of the part based on a combination of the measuring result of the vibration-based sensor and the measuring result of the temperature sensor";

the "special technical feature" of the subject matter of claim 3 relates to a constitution in which "a signal processing section diagnoses the part for an abnormality based on a vibration or temperature signal detected by the detection section during the inertial movement of the part in a predetermined speed region when current is not applied to the drive unit";

the "special technical feature" of the subject matters of claims 4-10 relates to a constitution in which "a signal processing section diagnoses the part for an abnormality based on a vibration signal or a temperature signal detected by the detection section when the part rotates at a speed in a rotational speed range of not less than 100min⁻¹ and not more than 1500min⁻¹;

the "special technical feature" of the subject matters of claims 11, 12, and 32 relates to "a signal processing section (process) that performs a frequency analysis on the waveform of an electrical signal, and extracts a peak of a spectrum obtained from the frequency analysis, which is larger than a reference value calculated on the basis of the spectrum, and collates the frequency between peaks and a frequency component attributable to any damage of the part, which is calculated on the basis of a rotating velocity signal or a moving velocity signal, and determines whether there is an abnormality in the part, and where the abnormality is present";

the "special technical feature" of the subject matters of claims 13-16 and 33 relates to "a signal processing section (process) which determines whether there is an abnormality in the part, and where the abnormality is present based on the frequency of shockwaves, where the waveform of an electric signal per unit time exceeds a threshold value, and a rotating velocity signal or a moving velocity signal";

the "special technical feature" of the subject matters of claims 17-31 and 34-37 relates to "a signal processing section (process) that performs a frequency analysis on the waveform of an electrical signal, and collates a spectrum component of the measurement spectrum data obtained from the frequency analysis and a frequency component attributable to any damage of the part, and determines whether there is an abnormality in the part, and where the abnormality is present, based on the collation result".

Since there is no technical relationship among these inventions involving one or more of the same or corresponding special technical features, these inventions are not considered so linked as to form a single general inventive concept.

4. Consequently, this opinion has been established in respect of the following parts of the international application:
- ☒ all parts
 - ☐ the parts relating to claims Nos. _____

**WRITTEN OPINION OF THE
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International application No.
PCT/JP2005/016845

| Box No. V | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | | |
|--|--|-------|-----|
| 1. Statement | | | |
| Novelty (N) | Claims | 3-37 | YES |
| | Claims | 1, 2 | NO |
| Inventive step (IS) | Claims | 11-37 | YES |
| | Claims | 1-10 | NO |
| Industrial applicability (IA) | Claims | 1-37 | YES |
| | Claims | | NO |
| 2. Citations and explanations: | | | |
| <p>Document 1: JP, 2004-184400, A (NSK Ltd.), 2 July, 2004 (02.07.04), Full text; all drawings, & WO, 2004/027370, A1</p> <p>Document 2: JP, 2004-93256, A (NSK Ltd.), 25 March, 2004 (25.03.04), Full text; all drawings, & WO, 2004/027370, A1</p> <p>Document 3: JP, 2004-150974, A (NIDEC Corp.), 27 May, 2004 (27.05.04), Full text; all drawings</p> <p>Document 4: JP, 2003-202276, A (NSK Ltd.), 18 July, 2003 (18.07.03), Full text; all drawings, & WO, 2002/037067, A1</p> <p>Document 5: JP, 2002-22617, A (Mitsubishi Electric Corp.), 23 January, 2002 (23.01.02), Full text; all drawings</p> <p>Document 6: JP, 9-113416, A (Nippon Steel Corp.), 2 May, 1997 (02.05.97), Full text; all drawings</p> <p>Document 7: JP, 9-500452, A (GENERAL ELECTRIC CO.), 14 January, 1997 (14.01.97), Full text; all drawings, & WO, 1995/030886, A1</p> <p>The subject matters of claims 1 and 2 do not appear to be novel or to involve an inventive step, since they are described in documents 1 and 2 cited in the ISR. Documents 1 and 2 respectively describe an abnormality diagnosis device to determine if any abnormality is present or absent based on the measuring results of a vibration sensor and temperature sensor.</p> <p>The subject matters of claims 3-10 do not appear to involve an inventive step in view of documents 1-3 cited in the ISR. Document 3 discloses that the vibration of a rotating operation device, in which freewheeling (corresponding to "inertial rotation") is taking place, is measured for operation evaluation of the device. So, a person skilled in the art could have easily conceived of applying the technical means described in document 3 to the abnormality diagnosis device described in document 1 or 2.</p> <p>The subject matters of claims 11-37 are neither described in any of the documents cited in the ISR nor obvious to a person skilled in the art.</p> | | | |